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Standard Potentials of the (MO_2^{2+}/MO_2^{+}) and (M^{4+}/M^{3+}) Redox Systems for Neptunium and Plutonium.

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The formal potentials of the (MO_2^{2+}/MO_2^{+}) and (M^{4+}/M^{3+}) couples (where M = Np or Pu) were determined in ClO_4^- medium of varying ionic strength. These data have been determined by using the Bröngsted-Gugenheim-Scatchard specific ionic interaction theory to give the following standard potentials and interaction coefficients, $\Delta\varepsilon = \varepsilon(Ox,ClO_4^-) - \varepsilon(Red,ClO_4^-)$, at 20°C:

$E°(NpO_2^{2+}/MO_2^{+})$	= 1.162 ± 0.011 V/NHE	$\Delta\varepsilon$ = 0.21 ± 0.03 kg/mole
$E°(PuO_2^{2+}/PuO_2^{+})$	= 0.954 ± 0.010 V/NHE	$\Delta\varepsilon$ = 0.29 ± 0.03 kg/mole
$E°(Np^{4+}/Np^{3+})$	= 0.210 ± 0.010 V/NHE	$\Delta\varepsilon$ = 0.33 ± 0.03 kg/mole
$E°(Pu^{4+}/Pu^{3+})$	= 1.015 ± 0.010 V/NHE	$\Delta\varepsilon$ = 0.54 ± 0.03 kg/mole

The published data on the neptunium and plutonium redox systems are reviewed, discussed and reinterpreted.